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DEPARTMENT OF TRANSPORTATION

National Highway Traffic Safety Administration

49 CFR Part 571

[Docket No. NHTSA–2016–0054]

Federal Motor Vehicle Safety Standards

AGENCY: National Highway Traffic Safety Administration (NHTSA), DOT.

ACTION: Denial of Petition for Rulemaking

SUMMARY: This document denies a petition for rulemaking, submitted by Ms. Scheryn Bennett, requesting that the National Traffic Safety Administration (NHTSA) require every vehicle to be equipped with an emergency glass breaking tool. The data available to the agency shows there is a great deal of uncertainty surrounding the actual number of occupants that may have died due solely to drowning while trapped in an immersed vehicle. The potential effectiveness of such a tool to successfully aid an occupant's safe exit from an immersed vehicle is also not known. In the absence of a requirement that each vehicle have a glass breaking tool, nothing prevents vehicle manufacturers from providing a tool or other means to allow vehicle evacuation during immersion. Additionally, consumers can purchase their own tool and locate it in the vehicle where they would be likely to access it in an emergency.

DATES: This denial is effective as of [INSERT DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: Office of Crashworthiness Standards, National Highway Traffic Safety Administration, 1200 New Jersey Avenue, SE, Washington, DC 20590.

FOR FURTHER INFORMATION CONTACT:

For Non-Legal Issues: Mr. James Myers, Office of Crashworthiness Standards, National Highway Traffic Safety Administration, 1200 New Jersey Avenue, SE, Washington, DC 20590, Telephone: (202) 493–0031, Facsimile: (202) 493–2739.

For Legal Issues: Ms. Rebecca Yoon, Office of Chief Counsel, National Highway Traffic Safety Administration, 1200 New Jersey Avenue, SE, Washington, DC 20590, Telephone: (202) 366–2992.

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I. Background

The National Traffic and Motor Vehicle Safety Act ("Safety Act," 49 U.S.C. § 30101 et seq.) authorizes NHTSA to issue safety standards for new motor vehicles and new items of motor vehicle equipment. The prescribed motor vehicle safety standards must be practicable, meet the need for motor vehicle safety, and be stated in objective terms. NHTSA does not endorse any vehicles or items of equipment. Further, NHTSA does not approve or certify

vehicles or equipment. Instead, the Safety Act establishes a "self-certification" process under which each manufacturer is responsible for certifying that its products meet all applicable safety standards. NHTSA has not established any standards pertaining to an emergency glass breaking tool, nor has the agency ever established a requirement that they must be provided with any vehicle.

II. Petition

On January 22, 2014, Ms. Scheryn Bennett, (henceforth referred to as Ms. Bennett), requested that NHTSA require every vehicle to be equipped with an “emergency window breaker.” Ms. Bennett cited the drowning deaths of a mother and her two minor children during an August 2011 flash flood in Pittsburgh, PA, and wrote that “evidence showed they [the victims] attempted to kick out the windows in their minivan.” Ms. Bennett expressed a concern for vehicle occupants to exit a passenger vehicle via a window after the vehicle has become trapped in water such that the water interrupts the vehicle electrical system, rendering the power windows inoperable. Additionally, Ms. Bennett contended that “[j]ust as a spare tire and jack are standard in all vehicles so should an emergency window breaker.”

III. Analysis of Petition

As a general matter, any proposed safety standard issued by NHTSA must meet the need for motor vehicle safety. Typically, we assess whether a standard would meet the need for motor vehicle safety by analyzing the real-world safety problem (which is the “safety need”), and then analyzing how well the safety problem can be addressed by the standard we are proposing (whether the safety need is met by the standard). It is challenging for the agency to justify a new regulation based only on an assumption that a particular vehicle safety feature or piece of equipment has potential for reducing injury or death in some crash scenarios.

A. Preliminary Analysis of Real World Data

Ms. Bennett provided a newspaper article reporting on the death of a mother and her two children that drowned in their minivan during a severe flash flood event. We searched for additional data that could support the existence of a safety need which could be addressed by an emergency window breaking tool. NHTSA's data review for this petition examined the information available in the agency's Fatality Analysis Reporting System (FARS) and Not-in-Traffic Surveillance (NiTS) databases. We also examined vehicle related cataclysmic drowning incident information available from the National Oceanic and Atmospheric Administration (NOAA) website.

NHTSA's FARS database is a nationwide census of yearly data regarding fatal injuries suffered in motor vehicle traffic crashes. However, it does not capture fatalities that occur directly as a result of a cataclysm, such as flooding. An example of this would be a motor vehicle swept away *while* a bridge the vehicle was crossing is washed out during a hurricane or flood. Accidents related to a cataclysm, but occurring after the cataclysm has ended, would be traffic crashes and would be in FARS. Such an example could be where a motor vehicle is driven into water *after* a hurricane or flood where a bridge was washed out.

In the 2011 technical paper *Drowning Deaths in Motor Vehicle Traffic Accidents*,¹ NHTSA reviewed data available in FARS and linked it to Multiple Cause of Death (MCoD) data from the Centers for Disease Control and Prevention (CDC). The information indicated that

¹ "Drowning Deaths In Motor Vehicle Traffic Accidents"; Rory Austin; National Highway Traffic Safety Administration; 22nd Experimental Safety of Vehicles Conference, Washington DC, Paper Number 11-0170, 2011. (<http://www-esv.nhtsa.dot.gov/Proceedings/22/files/22ESV-000170.pdf>)

drowning was involved in approximately 1 percent of the average annual motor vehicle occupant traffic fatalities for the time period reviewed for the paper (or 384 motor vehicle occupant traffic fatalities annually). NHTSA further analyzed the data for indications of possible occupant trauma that would indicate the fatally injured occupant(s) could have been unable to self-evacuate from their vehicle because of their physical condition at the time of the vehicle immersion. These included potentially incapacitating crash scenarios such as vehicle rollovers, impacts with fixed objects, alcohol levels at or above the legal limit, and occupant ejection cases. Removing incidents involving vehicle rollovers and alcohol/drug usage from the above 384 fatalities yielded an annual average of 81 crash fatalities involving accidental drowning. We further excluded events in which the vehicle struck a fixed object prior to entering the water. Based upon this analysis, there were 28 drowning fatalities that were caused by crashes where vehicle immersion or unknown factors were the first harmful event.² These 28 individuals are the group most likely to have been in a position to self-evacuate from their immersed vehicle. However, the database details are insufficient to conclusively determine which of these fatalities occurred solely due to drowning and not factors such as physical trauma, seat belt issues, confusion, or other unknown issues, and thus may have survived if an emergency glass breaking tool had been available in the vehicle.

NHTSA also examined the information available in our NiTS database. The NiTS database tracks nontraffic crashes which occur off of public roads in locations such as private roads, driveways, parking lots, and undeveloped areas. Unfortunately, the system does not have any linked mortality data, which prevents a similar analysis to the one for traffic fatalities using

² Ibid, Table 7 records an annual average of 106 fatalities for immersion events with no rollover. Per FARS database inquiry, 25 of these fatalities had BAC .08 or higher (106 minus 25 equals 81). Of the remaining fatalities, 53 were from incidents where the vehicle collided with a fixed object prior to entering the water. This leaves 28 average annual crash fatalities possibly due solely to drowning.

FARS. Furthermore, while the database can list a most harmful event of immersion when applicable, the results previously presented above from the technical paper *Drowning Deaths in Motor Vehicle Traffic Accidents*³ indicate that this variable does not provide a good proxy for counting drowning deaths. Additionally, the event details available are insufficient to determine if the individuals died inside or outside of their vehicles. Thus, this database could not provide data supporting a safety need for this petition.

NHTSA also researched flood related fatality information available on the NOAA website. The NOAA website uses data obtained from the CDC. Reviewing the listed event circumstances for only fatalities in which the persons died inside⁴ a motor vehicle, there were on average 34 people annually that died inside their vehicles for the years 2010 – 2014.⁵ The information available on the NOAA website does not permit an evaluation into possible escape methods that may have benefitted these individuals, which makes it difficult to use this information to establish a safety need. It is further not possible to determine the extent to which there is an overlap in the fatality count between the 28 FARS fatalities and the 34 NOAA fatalities of people dying each year inside their vehicles during motor vehicle water immersion incidents. Neither is it possible to determine whether these people had compromised physical conditions due to event induced trauma or whether unknown physical barriers such as event damaged vehicle systems prevented them from escaping their vehicle interiors prior to drowning. NHTSA's review of the available information did not provide data to support the safety need listed in Ms. Bennett's petition. The information does not reveal whether the people died in

³ Ibid., page 7

⁴ The NOAA data lists fatalities for people that escaped their trapped vehicle as a vehicle related fatality. The NOAA data also lists ATV and horse and buggy in the vehicle related category. These fatalities were excluded from our analysis since an emergency glass breaking tool would likely not have helped these people.

⁵ The NOAA information lists the following in-vehicle fatalities for vehicles trapped in floodwaters: 2010 44 fatalities; 2011 60 fatalities; 2012 9 fatalities; 2013 31 fatalities; and 2014 24 fatalities.

these accidents due solely to drowning or from some other cause. Because it cannot be determined exactly how these people died, it is challenging to develop specific safety recommendations that could prevent this type of fatality.

B. Potential Effectiveness of Tool

Multiple types of glass breaking tools are commercially available for consumers to purchase. The tools can be attached to a key chain, attached to a seat belt, mounted in the vehicle interior, or stored in a convenient location within the vehicle interior. These tools are intended to quickly and efficiently break the tempered glass⁶ material of a passenger vehicle's side window in order to create a vehicle emergency egress location. Currently-available glass breaking tools may be quite capable of vacating tempered glass from a window opening.

However, the glass breaking tools will not quickly and efficiently break those passenger vehicle side windows constructed with laminated glass⁷ material.⁸ The capability of glass breaking tools to break plastic glazing materials permitted for use in motor vehicles by FMVSS No. 205 is also unknown. Information on the percentage of passenger vehicles with side or rear windows constructed of laminated glass or plastic glazing materials is not collected by the agency. An examination of information available from the Enhanced Protective Glass Automotive Association indicates at least four dozen passenger vehicle models may have

⁶ Per ANSI/SAE Z26.1-1996 the term "tempered glass" means a single piece of specially treated sheet, plate, or float glass possessing mechanical strength substantially higher than annealed glass. When broken at any point the entire piece breaks into small pieces that have relatively dull edges as compared to those of broken pieces of annealed glass.

⁷ Per ANSI/SAE Z26.1-1996 the term "laminated glass" means two or more pieces of sheet, plate, or float glass bonded together by an intervening layer or layers of plastic material. It will crack or break under sufficient impact, but the pieces of glass tend to adhere to the plastic. If a hole is produced, the edges are likely to be less jagged than would be the case with ordinary annealed glass.

⁸ "Type of Glass in Your Car's Windows Could Change Escape Plan"; Deanna Dewberry, News 5 NBCDFW.com; May 6, 2013 (2014 NBC Universal Media, LLC.) <http://www.nbcdfw.com/investigations/Type-of-Glass-in-Your-Cars-Windows-Could-Change-Escape-Plan-206353031.html>; last accessed May 15, 2015.

laminated glass material at vehicle locations other than the front windshield.⁹ These vehicles tend to be lower volume, luxury models. Even in vehicles with laminated glass in side windows, there may be other windows with tempered glass, such as the rear window or potentially a sunroof. Drivers and occupants would need to not only know which windows are breakable by the emergency glass breaking tool and which are not, but would also need to be prepared to respond accordingly as their vehicle is filling with water.

There are other concerns related to the potential effectiveness of a requirement for such a tool beyond knowing which vehicle windows can or cannot be broken with the tool. First, it is not clear to the agency that a vehicle driver or passenger would be aware of the existence of such a device, its location, or how and when it should be used without additional information being provided. It is unclear whether information in the owner's manual would be sufficient to properly educate the vehicle occupants as to the existence of the device and its use. It is reasonable to assume the device would need to be located within the occupant compartment. However, the agency questions how likely it would be for the tool to be used if the tool was hidden away in the glove compartment or other non-visible location, or whether the tool would need to always be visible and within reach for it to be used when needed. The answer to that question may be tied to the success of the educational information referred to above.

There are many situationally dependent, time critical decisions that conscious occupants may face if their vehicle becomes immersed in water, particularly if it is caught in a flash flood. Do the occupants need to leave the vehicle interior to avoid drowning and how quickly should that happen? What is the best way to safely exit the vehicle? What is the fastest, most survivable path to exit the flood waters? What special considerations are needed to help children

⁹ "Enhanced Protective Glass Applications"; Enhanced Protective Glass Automotive Association; http://www.epgaa.com/?page_id=1673; last accessed May 15, 2015.

get out of the vehicle if only one adult is present? All of these decisions and many more must be made within a few seconds once such a life threatening event begins. Once a vehicle becomes completely submerged, the occupants will face a reduced chance of survival.¹⁰

All of the above issues are open questions that will affect the real world effectiveness of a requirement to provide an emergency glass breaking tool. Based on the information available to NHTSA about the apparent size of the safety problem (i.e., the number of people who die each year from drowning in their vehicle because they could not open the window and were not otherwise incapacitated) and the lack of information available about how well emergency glass breaking tools might address that safety problem, the agency is unable to say with confidence that a requirements for an emergency window breaking tool would meet the need for safety, as required by the Safety Act.

C. Cost Effectiveness

Anecdotal market research on commercially available tempered glass breaking tools shows that there are a variety of tools marketed as emergency window glass breaking tools. They are generally either a type of hammer or a spring loaded punch. Some of the available tools are intended solely for breaking glass. Other tools provide additional functionality such as seat belt cutters, flashlights, or even tire pressure gauges. Purchase costs for these tools range from approximately \$3.50 to \$20.00 each.

In addition to the preliminary nature of the above cost estimates, there are several other barriers to making a reasonable estimate of the cost effectiveness of a potential requirement for this tool. First, as previously discussed, the available motor vehicle crash information suggests

¹⁰ Gordon G. Giesbrecht, "My Car Is Sinking: Automobile Submersion, Lessons in Vehicle Escape," *Aviation, Space, and Environmental Medicine*, Volume 81, Issue 8, August 2010.

that the number of people that might be expected to require a means of escaping an immersed vehicle through a window opening may be on the order of 28 persons annually. However, as also outlined above, there is a great deal of uncertainty surrounding any estimate, as the data does not permit a conclusive determination on the number of fatalities due solely to drowning, even when immersion is the first harmful event. Second, the potential effectiveness of the tool measured by an occupant's ability to safely exit a vehicle is not known. Although the glass breaking tool is expected to easily shatter tempered glass when used, there are other factors that are very likely to reduce the effectiveness of the tool. High among these would be a lack of knowledge of the existence of the tool and finding it as a vehicle becomes immersed. Thus, the uncertainty in the population of vehicle occupants that require the tool and in its potential effectiveness results in a highly uncertain assessment of potential benefits. Any resulting cost effectiveness estimate would be tenuous.

D. Response to Standard Equipment Statement

Ms. Bennett wrote that spare tires and jacks are “standard” on all vehicles. This is not correct; NHTSA has issued no standard or regulation which requires vehicles to be provisioned with a spare tire and tools for changing tires. Many vehicles do not have a spare tire and jack, but rather other means of facilitating the temporary driving of a vehicle after a tire becomes flat, such as an inflator and sealant kit or run-flat tires.¹¹

The vehicle original equipment manufacturers (OEMs) may offer consumers the option to purchase motor vehicle equipment that provides safety benefits beyond the minimum requirements of the various FMVSS. Just as several OEMs sell optional first aid and road side

¹¹ *Your next car may not have a spare tire*; Jim Travers; Consumer Reports.Org article; Published August 16, 2014; last accessed May 15, 2015; <http://www.consumerreports.org/cro/news/2014/08/your-next-car-may-not-have-a-spare-tire/index.htm>.

assistance kits for their vehicles, they could sell an appropriate glass breaking tool with recommended procedures for usage during an emergency.

Consumers also have the option to equip their vehicles with emergency safety equipment. Items such as fire extinguishers, automotive tool kits, aftermarket vehicle jacks and lug wrenches, battery jumper cables, first aid kits, winter emergency survival kits, survival kits for desert travel, and vehicle break down kits are items available for consumers to purchase for emergency preparedness. Consumers who do purchase safety items for their vehicles may be more likely to know where these items are stored in their vehicles and how to use the equipment. All vehicle operators are strongly encouraged to understand their vehicle's capabilities and safety features, their expected driving environment, and to be prepared for possible emergency situations.

IV. Conclusion

NHTSA shares Ms. Bennett's desire to prevent deaths in motor vehicles. However, at this time there are several substantial obstacles to proposing an objective motor vehicle safety standard to assist vehicle occupants in evacuating a passenger vehicle that has become immersed in water.

First, as previously explained, the data available to the agency shows there is a great deal of uncertainty surrounding any estimate of occupants requiring the use of the glass breaking tool. Second, the potential effectiveness of the tool to provide drivers and occupants with a method to safely exit a vehicle during an immersion event is not known. Due to the uncertainty surrounding whether the glass breaking tool would successfully aid all occupants in all vehicles during a vehicle immersion situation, NHTSA cannot justify a mandate for such a tool.

Even without a requirement that each vehicle have a glass breaking tool, there is nothing to keep vehicle manufacturers from providing it or other means to allow vehicle evacuation during immersion. In addition, consumers can purchase their own tool and locate it in the vehicle where they would be likely to access it in an emergency. Those consumers who do this may be more aware of the existence of the tool when the need to use it arises than would occupants of a vehicle where the tool has been provided as standard equipment.

In accordance with 49 CFR Part 552, NHTSA hereby denies Ms. Scheryn Bennett's January 22, 2014, petition to require every vehicle to be equipped with "an emergency window breaker."

Authority: 49 U.S.C. 322, 30111, 30115, 30117, and 30162; delegation of authority at 49 CFR 1.95.

Issued in Washington, DC under authority delegated in 49 CFR 1.95.

Raymond R. Posten
Associate Administrator for
Rulemaking

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